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AUTOMATIC GUIDING DEVICE WITH DIPSLAY PART AND OPERATION PART
[Hyoujibu oyobi sousabu wo yuusuru jidouan'nai souchi]

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[Claims] /2*

[Claim 1] With respect to an automatic guiding device provided with a display part and an operation part,

an automatic guiding device equipped with:

a height recognizing part that recognizes the height of the user;

a device height recognizing part that recognizes the height of the automatic guiding device itself;

an operation part in which the height amount of the automatic guiding device to be adjusted is calculated based on the height of the user recognized by the height recognizing part and the height of the automatic guiding device recognized by the device height recognizing part; and

a height adjusting mechanism part that adjusts the height of the automatic guiding device based on the operation result of the operation part.

[Claim 2] With respect to an automatic guiding device provided with a display part and an operation part,

an automatic guiding device equipped with:

a height recognizing part that recognizes the height of the user;

a device height recognizing part that recognizes the height of the automatic guiding device itself;

an operation part that calculates the amount of height adjustment of the automatic guiding device to be adjusted based on the height of the user recognized by the height recognizing part and the height of the automatic guiding device recognized by the device height recognizing part;

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* Number in the margin indicates pagination in the foreign text.

a user verifying means that confirms that the user has arrived at the front of the automatic guiding device, and

a height adjusting mechanism part that adjusts the height of the automatic guiding device based on the operation result of the operation part when it is confirmed by said user verifying means that the user has arrived at the front of the automatic guiding device.

[Claim 3] An automatic guiding device of Claim 1 or Claim 2 provided with a display part and an operation part characterized by being equipped with:

a device utility finish confirming means that confirms that the user has moved away from the automatic guiding device; and

a resetting means that returns the height of the automatic guiding device to a predetermined standard height when a set time has elapsed after it was confirmed that the user moved away from the front of the automatic guiding device by means of said device utility finish confirming means.

[Claim 4] A height adjusting device for an apparatus of Claim 1, 2, or 3 provided with a display part and an operation part characterized by being equipped with a height fine-adjusting means that finely adjusts the height of the apparatus based on user instructions.

[Detailed Explanation of the Invention]

[0001] [Industrial Field of Application]

The present invention relates to an automatic guiding device with a display part and an operation part.

[0002] [Prior Art]

Examples of an automatic guiding device equipped with a display part and an operation part include unmanned guiding devices installed in police boxes, hotels, department stores, etc. and automatic transaction devices installed in banks. However, the height levels (positions) of the display parts and operation parts of these conventional automatic guiding devices are fixed at certain heights that match the average adult heights.

[0003] [Problems that the Invention is to Solve]

For this reason, when a short child or elderly uses a conventional automatic guiding device, the positions of the display part and operation part are too high, and it is difficult to see or operate the display screen. Conversely, a tall person needs to bend over in order to look at the display part or operation part. Either way, there is a problem in that it is difficult to use for people of non-average heights. For this reason, it has been desired that a technique for automatically adjusting the height be developed for automatic guiding devices with display parts and operation parts such as unmanned guiding devices, etc. used by various people.

[0004] [Means for Solving the Problems]

In order to solve the above-described problems, an automatic guiding device of the present invention that is provided with a display part and an operation part is equipped with: a height recognizing part that recognizes the height of the user; a device height recognizing part that recognizes the height of the automatic guiding device itself; an operation part that calculates the amount of height adjustment of the automatic guiding device based on the height of the user recognized by the height

recognizing part and the height of the automatic guiding device recognized by the device height recognizing part; and a height adjusting mechanism part that adjusts the height of the automatic guiding device based on the operation result of the operation part.

[0005] [Operation of the Invention]

In an automatic guiding device of the present invention that is equipped with a display part and an operation part, the height recognizing part recognizes the height of the user, and the device height recognizing part recognizes the height of the automatic guiding device itself. Moreover, the height amount of the automatic guiding device to be adjusted is calculated by the operation part based on the height of the user recognized by the height recognizing part and the height of the automatic guiding device recognized by the device height recognizing part, and the adjusting mechanism part adjusts the height of the automatic guiding device based on this calculation result.

[0006] [Embodiment of the Invention]

Figure 1 is a perspective drawing of one embodiment in which the present invention is applied to an unmanned guiding device. In the figure, [1] is an enclosure that surrounds the main unit [3] of a later-described unmanned guiding device and that has a コ-shaped horizontal cross-section, and horizontal pairs of transmission-type light sensors [5] are positioned vertically along the ends of both sides of the opening at equal intervals. The individual transmission-type light sensors [5] are structured to generate signals that correspond to their installation positions (heights). The main unit [3] of the unmanned guiding device is composed of an upper

main unit [3A], which is provided with an operation part [7] and a display part [9], and a lower main unit [3B], which is positioned below the upper main unit [3A], and the upper main unit [3A] can move vertically against the lower main unit [3B]. [11] is a mat that detects that a user has arrived at the front of the main unit [3] of the unmanned guiding device by detecting human weight, and it is attached to the main unit [3] of the unmanned guiding device. [12] is an operation switch for the user to adjust the height of the main unit [3] of the unmanned guiding device oneself.

[0007] Figure 2 is an explanatory drawing for explaining the mechanism that is for vertically moving the main unit [3A] of the upper part, and it illustrates the main unit [3] of the unmanned guiding device in a partially cut-out manner. In Fig. 2, [13] is a hydraulic control device that vertically moves a hydraulic shifting shaft [13] by controlling /3
oil pressure. The hydraulic shifting shaft [15] has the upper main unit [3A] attached to it, and the height of the upper main unit [3A] can be changed by vertically moving the hydraulic shifting shaft [15]. The hydraulic control device is structured in a manner such that it vertically moves the hydraulic shifting shaft [15] based on instructions from a later-described control part equipped to the main unit [3] of the unmanned guiding device.

[0008] Figure 3 is an explanatory drawing for explaining the height recognizing part that recognizes the height of the device itself in the main unit [3] of the unmanned guiding device. Figure 3(a) illustrates its appearance, and Fig. 3(b) is a magnified view of the part [A] of Fig. 3(a). In Fig. 3(a), [3a] is the chassis of the upper main unit [3A], and

[3b] is the chassis of the lower main unit [3B]. The lower end of the chassis [3a] covers the upper end of the chassis [3b]. Moreover, in Fig. 3(b), [17] are position specifying fixtures provided on the inner surface of the chassis [3a] of the upper main unit [3A] and are positioned at constant intervals from [A1], which is at the lowest position, to [An], which is at the highest position. [19] is a position detecting fixture that is provided at the upper end of the outer surface of the chassis [3b] of the lower main unit [3B] and detects the position of the upper main unit [3A] by coming into contact with a position specifying fixture [17]. The intervals of the position specifying fixtures [17] are set in accordance with the transmission-type light sensors [5], and [a1] ~ [an] of the transmission-type light sensors [5] correspond to [A1] ~ [An] of the position specifying fixtures [17], respectively.

[0009] Figure 4 is a system block diagram of the present embodiment, and parts identical to those of Figs. 1 ~ 3 are indicated by the same reference numerals. In the figure, [21] is a control part installed in the main unit [3] of the unmanned guiding device and controls the hydraulic control device [13] based on input signals from the transmission-type light sensors [5], position specifying fixtures [17], position detecting fixture [19], mat [11], and operation switch [12].

[0010] Figures 5 and 6 are operations flow charts of the control part [21] of a case in which the user starts using the unmanned guiding device and of a case in which the user finishes using the unmanned guiding device, respectively. First, the operation of the control part [21] performed at the start of usage will be explained based on Fig. 5 and

Figs. 1 through 4. When there is no user, the height of the upper main unit [3A] is set to match a person of the standard height. At this time, the position detecting fixture [19] is in contact with the fixture [Ak], which is one of the position specifying fixtures [17].

[0011] When the user enters the enclosure [1], passes between the transmission-type light sensors [5] on the left and right, and blocks the sensor light of the transmission-type light sensors [5], information indicating that the sensor light became blocked becomes input from the transmission-type light sensor [5] to the control part [21] (S1). At this time, the control part [21] determines that the position of the highest sensor from among the transmission-type light sensors [5] that input the information is the height of the user. For example, if the transmission-type light sensor [5] at the highest position is [a2], the position (height) of [a2] is recognized as the height of the user. The control part [21] compares the positional relationship between the information [a2], which was recognized as being the height of the user, and the fixture [Ak], which is one of the position specifying fixtures [17], that is in contact with the position detecting fixture [19], and then determines whether or not it is necessary to adjust the height of the main unit [3] of the unmanned guiding device (S3). If it is determined that adjustment is necessary as a result, the movement direction that allows the position detecting fixture [19] to come into contact with the position specifying fixture [17] [A2], which corresponds to [a2], becomes determined and stored (S5).

[0012] After that, when the user approaches the main unit [3] of the unmanned guiding device and steps onto the map [4], the sensor of the mat [4] communicates the information indicating that the user stepped onto the mat to the control part [21] (S7), and the control part [21] instructs the hydraulic control device [13] to move the upper main unit [3A] in the direction that was determined earlier (S9). In response to this instruction, the hydraulic control device [13] vertically moves the hydraulic shifting shaft [15] by controlling oil pressure. Then, after the position detecting fixture [19] comes into contact with the fixture [A2], which is one of the position specifying fixtures [17], and after information indicating it becomes input to the control part [21] (S11), the control part [21] instructs the hydraulic control device [13] to stop (S13).

[0013] The automatic adjustment is a rough adjustment. If the user desires a finer adjustment, it can be done by using the operation switch [12]. Each time there is an instruction from the operation switch [12] (S15), the control part [21], based on the instruction, gives an instruction to the hydraulic control device [13] (S17). Based on this instruction, the hydraulic control device [13] vertically moves the hydraulic shifting shaft [15] to perform a fine adjustment. If the position detecting fixture [19] comes into contact with a fixture [Ak] (the fixture indicating the standard height), which is one of the position specifying fixtures [17], during this fine adjustment (S19), this current movement direction of the upper main unit [3A] becomes stored instead of the movement direction that was stored in S5 (S21). This concludes the operation of

the control part [21] performed at the start of usage.

[0014] Next, the operation of the control part [21] at the end of usage will be explained based on Fig. 6 and Figs. 1 through 4. When the user finishes using the device and moves away from the mat [11], this is communicated to the control part [21] by the sensor of the mat [11] (S31). Then, after a certain time has passed (S33), the control part [21] determines the movement direction of the upper main unit [3A] as being the direction opposite of the movement direction stored at the start of usage (S35). Then, the control part [21] instructs the hydraulic control device [13] to move the upper main unit [3A] in the direction determined in S35 (S37), and the hydraulic control device [13] moves the hydraulic shifting shaft [15] based on the instruction. As a result of the movement, the position detecting fixture [19] comes into contact with a fixture [Ak], which is one of the position specifying fixtures [17], and after this information is input to the control part [21] (S39), the control part [21] instructs the hydraulic control device [13] to stop (S41). Thus, the operation is finished.

[0015] In the present embodiment, the height of the upper main unit [3A] is adjusted after the height of the user is recognized by means of the enclosure [1] and after it is then confirmed that the user has stepped onto the mat [11]. Therefore, if a user passed the enclosure [1] by mistake, the height adjustment is not carried out, and the device is thus kept from working unnecessarily.

[0016] Moreover, since the height of the main unit [3] of the /4
unmanned guiding device is returned to the standard height after the user

has finished using the device, the amount of adjusting can be small at the time of usage, and height adjustment can be carried out smoothly. Moreover, it is recognized that the device has finished being used when a certain time has passed after the user moved away from the mat [11]. This prevents the device from operating falsely.

[0017] Moreover, since the height can be adjusted based on an instruction from the user by means of the operation switch [12], it is possible to adjust the height more appropriately. Moreover, according to the present embodiment, if the upper main unit [3A] passed the standard height position (if the position detecting fixture [19] came into contact with the fixture [Ak], which is one of the position specifying fixtures [17]) during a fine adjustment performed by means of the operation switch [12], this movement direction is stored in order to determine the movement direction when the position is returned to the standard position after the device has finished being used. Therefore, even in a case in which, for example, a tall person passed the enclosure [1] while bending, the height was therefore recognized as being shorter, the height of the upper main unit [3A] was thus set lower than the standard height, and the height was then set higher than the standard height by means of fine adjustment using the operation switch [12], it is possible to determine the movement direction to be used for returning the position to the standard position after the device has finished being used.

[0018] Moreover, the above embodiment was explained by using an example in which the mat [11], which detects the weight of the user, is used as a sensor that detects that the user has arrived at the front of

the main unit [3] of the unmanned guiding device, but it may be any other sensor, such as a radio-wave sensor used for an automatic door, as long as it recognizes that the user has arrived at the front of the main unit [3] of the unmanned guiding device.

[0019] Moreover, the unmanned guiding device was used as an example to explain the above-mentioned embodiment, but the invention is not confined to this. As long as it is an apparatus equipped with a display part and an operation part, it can also be applied to other apparatuses, such as automatic teller machines installed at banks.

[0020] [Effects of the Invention]

As explained in detail earlier, the present invention automatically adjusts the height of an automatic guiding device by recognizing the height of the user. Therefore, the position of the display part or operation part can be automatically adjusted to an appropriate height when a person of a non-average height, such as a child or elderly, uses the device. Therefore, the display part is easy to see, and the operation is easier to perform.

[Brief Explanation of the Drawings]

[Figure 1] A perspective drawing of one embodiment in which the present invention is applied to an unmanned guiding device.

[Figure 2] An explanatory drawing for explaining the mechanism utilized for the vertical movements of the upper main unit [3A].

[Figure 3] An explanatory drawing for explaining the height recognizing part of the main unit [3] of the unmanned guiding device that recognizes the height of the device itself.

[Figure 4] A system block diagram of this embodiment.

[Figure 5] An operation flow chart of the control part [21] implemented when the user starts using the unmanned guiding device.

[Figure 6] An operation flow chart of the control part [21] implemented when the user finishes using the unmanned guiding device.

[Explanation of the Reference Numerals]

[1] = enclosure

[3] = main unit of the unmanned guiding device

[5] = transmission-type light sensor

[7] = operation part

[9] = display part

[11] = mat

[12] = operation switch

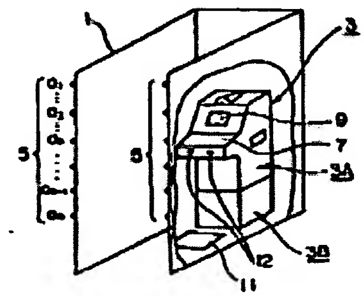
[13] = hydraulic control device

[15] = hydraulic shifting shaft

[17] = position specifying fixture

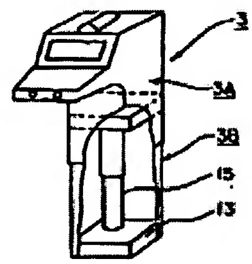
[19] = position detecting fixture

[Figure 1] Perspective Drawing of the Embodiment



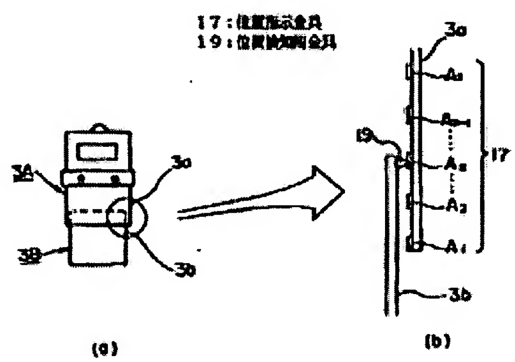
Key: 1)enclosure; 3)main unit of the unmanned guiding device; 5)transmission-type light sensor; 7)operation part; 9)display part; 11)mat; 12)operation switch.

[Figure 2] Drawing for Explaining the Mechanism for Vertical Movements



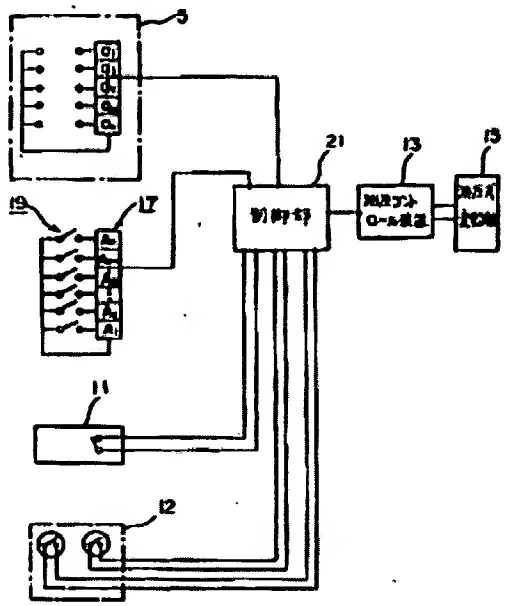
Key: 13) hydraulic control device; 15)hydraulic shifting shaft.

[Figure 3] Drawing for Explaining the Height Recognizing Part /5



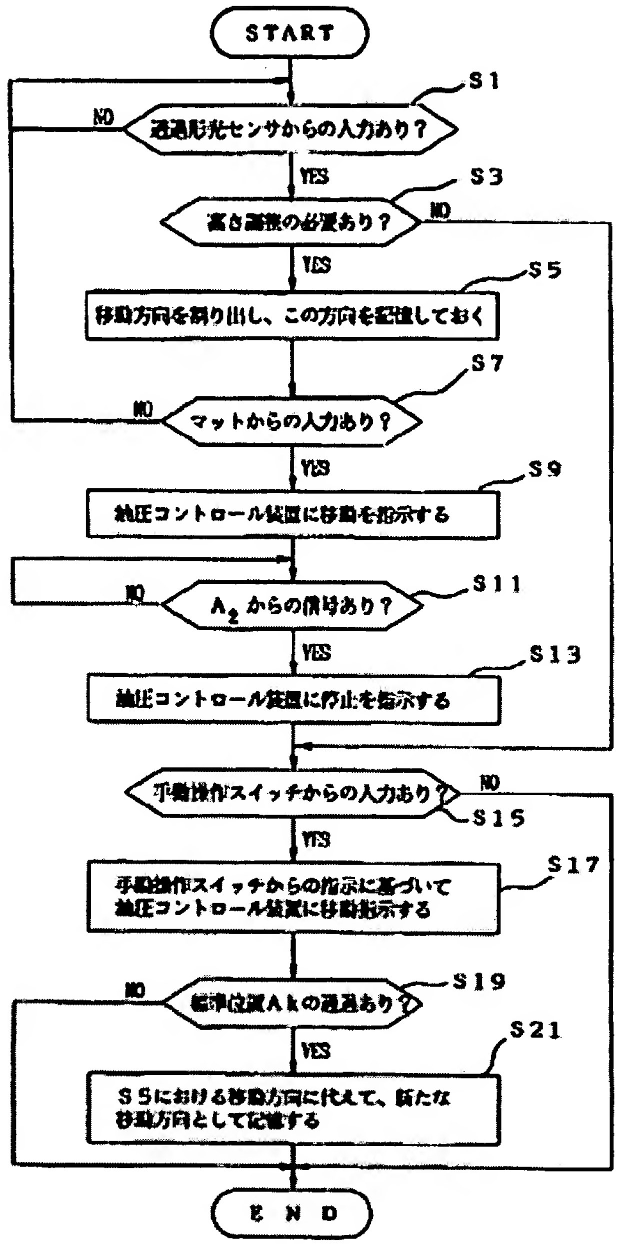
Key: 17) position specifying fixture; 19)position detecting fixture.

[Figure 4] System Block Diagram of the Embodiment



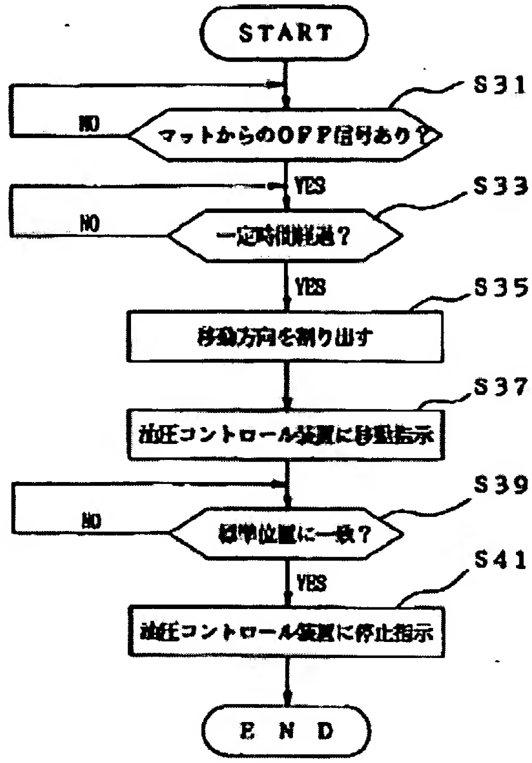
Key: 13) hydraulic control device; 15) hydraulic shifting shaft; 21) control unit.

[Figure 5] Operation Chart of the Control Part [21] at the Start of Usage



Key: S1) Is there input from a transmission-type light sensor?; S3) Does the height need to be adjusted?; S5) The movement direction is determined and stored; S7) Is there input from the mat?; S9) The hydraulic control device is instructed to move.; S11) Is there a signal from [A_2]?; S13) The hydraulic control device is instructed to stop.; S15) Is there input from the manual operation switch?; S17) The hydraulic control device is instructed to move based on an instruction from the manual operation switch.; S19) Was the standard position [Ak] passed?; S21) A new movement direction is stored and replaces the movement direction of S5.

[Figure 6] Operation Chart of the Control Part [21] at the End of Usage



Key: S31) Is there an OFF signal from the mat?; S33) Has a set time elapsed?; S35) The movement direction is determined; S37) The hydraulic control device is instructed to move.; S39) Does it match the standard position?; S41) The hydraulic control device is instructed to stop.